

WHAT IS CLAIMED IS:

1. A method for controlling performance of a machine controlled by at least one control module having an input-output relationship regulated by control parameters, said method comprising the steps of:

5 (a) configuring a first generation of chromosomes coding for the control parameters by preselecting genes constituting the first generation of chromosomes from a selection space used as a gene pool, and activating the machine using the first generation of chromosomes, said genes being defined by coordinates in the selection space;

10 (b) selecting and scoring adapted chromosome(s) by evaluating each chromosome based on signals indicative of performance of the machine;

(c) setting a search area in the selection space in accordance with the score(s) under predetermined rules;

15 (d) selecting genes for a subsequent generation of chromosomes within the search area, and operating the machine using the subsequent generation of chromosomes; and

(e) repeating steps (b) through (d) while operating the machine until desired performance of the machine is demonstrated.

20 2. The method according to Claim 1, wherein the coordinates and/or the size of the search area in the selection space are changed in accordance with the score(s) of the adapted chromosome(s).

3. The method according to Claim 1, wherein the selection of genes is conducted randomly in the search area.

25 4. The method according to Claim 1, wherein the selection of genes is conducted in the search area based on the coordinates of the genes of the adapted chromosome(s).

5. The method according to Claim 1, wherein the central coordinates of the search area of the subsequent generation is set at the coordinates of the genes of the adapted chromosome(s) in the selection space.

30 6. The method according to Claim 1, wherein the central coordinates of the search area of the subsequent generation is set in the selection space at coordinates calculated from weighted averages of the coordinates of the chromosomes of the current generation based on their scores.

7. The method according to Claim 1, wherein the size of the search area for a subsequent generation is changed in accordance with the scores of the chromosomes of the current generation.

5 8. The method according to Claim 7, wherein the size of the search area for a subsequent generation is changed in accordance with the score(s) of the adapted chromosome(s).

9. The method according to Claim 7, wherein the size of the search area for a subsequent generation is changed in accordance with the average score of the respective chromosomes of the current generation.

10 10. The method according to Claim 1, wherein the size of the search area for a subsequent generation is changed in accordance with a distance between the central coordinates of the search area for the current generation and the central coordinates of the search area for the subsequent generation.

11. The method according to Claim 1, wherein the size of the search area for a subsequent generation is changed in accordance with the central coordinates of the search area of the subsequent generation.

12. The method according to Claim 1, wherein a group of candidate chromosomes of a subsequent generation is selected based on distances between any candidate chromosomes of the subsequent generation in the selection space.

13. The method according to Claim 1, wherein a group of candidate chromosomes of a subsequent generation is selected based on distances between chromosomes generated currently and in the past in the selection space.

14. The method according to Claim 12, wherein the distances are defined using vectors connecting any two coordinates of genes.

15 15. The method according to Claim 13, wherein the distances are defined using vectors connecting any two coordinates of genes.

16. The method according to Claim 1, wherein the indicative signals are sensory signals, and a user who operates the machine scores the chromosomes based on the sensory signals.

17. The method according to Claim 1, wherein the indicative signals are electronic signals, and a device which receives the signals scores the chromosomes by comparing values of the signals with preselected target values.

18. The method according to Claim 1, wherein the machine is a motor.